

Radiation Processing Of Polymer Materials And Its Industrial Applications

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Radiation Processing Of Polymer Materials

Up-to-date, comprehensive coverage on radiation-processed polymer materials and their applications Offering a unique perspective of the industrial and commercial applications of the radiation processing of polymers, this insightful reference examines the fundamental scientific principles and cutting-edge developments advancing this diverse field.

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Through a variety of case studies, detailed examples, and economic feasibility analysis, Radiation Processing of Polymer Materials and Its Industrial Applications systematically explains the commercially viable ways to process and use radiation-processed polymeric materials in industrial products. In addition, this one-of-kind text:

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Radiation Processing of Polymer Materials and Its ...

the 1970s, because of the availability of more reliable industrial electron. accelerators (e.g., the Dynamitron), the lowering of the operation cost of. electron beam accelerators and the optimization of γ -irradiator design and. safety, radiation processing of polymers has developed into an industry of its.

RADIATION PROCESSING OF POLYMER MATERIALS AND ITS ...

Radiation processing is widely employed in plastics engineering to enhance the physical properties of polymers, such as chemical resistance, surface properties, mechanical and thermal properties, particle size reduction, melt properties, material compatibility, fire retardation, etc. Drobny introduces readers to the science of ionizing radiation and its effects on polymers, and explores the technologies available and their current and emerging applications.

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Hence radiation processing of polymers has been paid attention to eradicate the limit of polymer modifications. The advantages of the radiation processing are led by reaction initiation induced by active radicals created by high-energy irradiation.

Radiation Processing of Polymers and Its Applications ...

Radiation processing can modify the molecular weight, hydrophilicity and mechanical properties of the polymer either by direct irradiation or by grafting suitable polymeric segments on their backbone without using any toxic initiator/product in their backbone.

Progress in radiation processing of polymers - ScienceDirect

RADIATION STERILIZATION. Karl J. Hemmerich | Feb 01, 2000. Gamma and electron-beam irradiation are among the most popular and well established processes for sterilizing polymer-based medical devices. It has been long known, however, that these techniques can lead to significant alterations in the materials being treated.

Polymer Materials Selection for Radiation-Sterilized ...

Injection-molded, blow-molded, or extruded parts made from a range of polymer materials (including PEs, PLA, PVDF, UHMWPE, PVC, EVA, EPDM, SBR, nylons, natural rubber, and other polymers) may be cross-linked with radiation to improve such properties as their temperature rating, mechanical properties, ESCR (Environmental Stress Cracking) and chemical solvent resistance, or other properties.

Material Modification Services for Polymers - Sterigenics

cal device area, radiation processing is used to manufacture hydrogels and to modify ultra-high molecular weight polyethylene (UHMWPE) for implants. Radiation processing is supported by the

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continued progress in electron beam (EB) accelerator development [4, 5]. A variety of electron beam para-

APPLICATIONS OF IONIZING RADIATION IN MATERIALS PROCESSING

The Effect of Radiation on Properties of Polymers examines the effects of radiation on plastics and elastomers. Polymers are required in products or parts for a range of cutting-edge applications that are exposed to radiation, in areas such as space, medicine, and radiation processing.

The Effect of Radiation on Properties of Polymers - 1st ...

Recent advances in synchrotron radiation (SR) light sources and detection techniques allow one to measure the structural evolution of polymer films during post-stretching processing in real time with ultrahigh time resolution, which benefits the understanding on this topic.

Recent advances in post-stretching processing of polymer ...

Crosslinking can be achieved using chemicals, but the process requires higher temperatures. The alternative, the irradiation of polymers, leads to the formation of permanent bonds between the polymer chains at room temperature - which requires lower operating costs and provides a more environmentally-friendly process.

Radiation Processing Enables Small Businesses to Enter ...

The major challenge of every radiation processing application where macromolecules are involved is the inhibition of unwanted material property changes which often occur when materials are irradiated and to predict useful lifetimes.

Stability and stabilization of polymers under irradiation

Globally, approximately half of the single-use (polymer-based) medical devices manufactured today

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are sterilized using ionizing radiation from three main sources - the Co-60 radioisotope (gamma-rays), an electron-beam (e-beam) accelerator, or an e-beam accelerator with a target to convert the beam to X-rays.

Radiation Effects on Polymer Materials

radiation and its interactions with materials, and then goes into the radiation chemistry of liquid and solid systems, radiation-induced grafting, crosslinking, polymerization, polymer degradation and oxidation. Analytical methods for characterization of irradiated materials and applications of radiation processing to polymers are then covered.

APPLICATIONS OF IONIZING RADIATION IN MATERIALS PROCESSING

intensify radiation damage. Generally, polymers containing aromatic ring structures (e.g. polystyrene) are resistant to radiation effects. Aliphatic polymers exhibit degrees of resistance depending upon their levels of unsaturation and substitution. Some effects of radiation—such as reduced elongation due to chain scission, may detract

Material Consideration Radiation Processing

The aim of this study was to increase both the rates of dissolution and bioavailability of the amlodipine (Amlol) drug. Due to the low cost, high solubility, and amorphous state, polyvinylpyrrolidone (PVP) has been used as a drug carrier in the solid dispersion process. Through applying an irradiation technique, powder of (PVP) is irradiated with six 0–50 kGy irradiation doses. The six ...

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